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TO

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ELECTRIFICATION IN BOMBAY STATE.

(Note: Some of the general information previously published has been reproduced for the benefit of the readers in order to enable them to follow the progress since the last repor

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Programmedx of Electrification
Index to Prosperity.

The part that cheap and abundant supply of electric power can play in the development of a count agricultural and industrial potential cannot be over-emphasised. The amount of electrical energy used per head population in a region is now accepted as an index of its progress, prosperity and standard of living. The power generation facilities at the disposal of a country has been regognised to indicate its capacity to produce wealth.

2. It is, therefore, axiomatic that with the availability of abundant electric power supply at an ec price in urban and rural areas, not only will the lev of employment progressively rise, but the average production capacity of agricultural and industrial workers will also increase appreciably. Supply of electricity to public is considered all over the world as a basic industry and, without it, material progress would well.n be impossible.

3. While Bombay State is well a head of the other States of India in the matter of electric supply thanks to the spirit of enterprise of its people

people, it is far below the level of power development achieved by other progressive countries of the world. Although the population of this State forms only about 1/20th of the total in the country, its accounts for nearly a third of electricity generated in the whole of India.

5. Bombay's power supply, large as it might appear according to Indian Standards, is very small indeed when looked at from the world view point as will be seen from the following figures of per capita production of electricity in advanced countries of Europe and America:-

Country :	Per Capita Production.
Canada	3170 units.
Switzerland	1810 "
United States.	1750 "
Sweden.	1180 "
Russia .	820 "
United Kingdom.	817 "
France.	452 "
Bombay State.	65.6.

PRESENT STAGE OF ELECTRICAL DEVELOPMENT IN BOMBAY STATE.

6. In the state of Bombay there are at present 122 Licensees in operation (including the Licences of the former Indians States, now merged with Bombay State) Three of these licensees operate hydro-electric stations, their installed capacity being 248000 KW. They jointly serve, by bulk supply Bombay City, Bombay Suburban District, Poona and six other townships. Almost all the remaining licensees generat their own electric energy of these one has an installed capacity of 82,500 KW. as at end of 1950 and another 5474 KW.

Besides the above, there are 20 power stations (including merged states) owned and operated by the Bombay Government.

6. It will be seen from the above, that the development of electic supply has hee far been made almost entirely by private enterprise. Accordin-

Accordingly, only such places have been selected for electrification as would be a paying business proposition. Consequently, smaller towns and rural areas have been left out as from business point of view it is not economical to run electrical lines over long distances in rural areas for supplying electricity to scattered rural loads. So far only 144 cities and largish towns in this state have had the benefit of electricity

The Electric Grid Department.

7. To rectify the ~~existing~~ situation described above the Government of Bombay set up in 1944 the Electric ~~Scheming~~ Grid Department which was entrusted with the task of ensuring the co-ordinated development of the supply of electricity within the province in the most efficient and economical manner with particular reference to such development in areas not at present served by any licensee. Its main functions are summarised as follows.

1) To investigate, plan and execute hydro and thermal electric power schemes and establish grid system in regions which lend themselves to such developments economically.

2) To establish small Nursery Schemes in isolated townships or concentrated rural areas which have cottage industries or scope for lift irrigation and which cannot within reasonable time be served from Grid lines by establishing small thermal stations or distributing power purchased in bulk from the nearby Licensee.

3. To promote rapid development of the use of electricity by agriculturists and small scale industrialists especially in the rural areas, by assisting them financially in acquiring utilisation equipment on hire purchase system.

Appreciating that rapid development of electric supply on commercial lines could best be carried out by a semi-autonomous board, the Government of Bombay drafted a Bill for enactment by H.E.....

by H.E. the Governor in 1946. Owing to some legal technicalities, the bill could not be enacted by the ~~Government~~ Governor. The Government of India was, therefore, requested to arrange for the Bill to be passed by the Central Legislature. This resulted in the Parliament enacting in November 1948, the Electricity (Supply) Act, 1948.

8. The Act Provides for setting up of the State Electricity Boards within two years from the dated of enactment. These Boards have been charged with the duties of promoting the co-ordinated development of the generation, supply and destribution of electricity within the state in the most efficient and economical manner with particular ~~reference~~ regard to such development in areas not for the time being served or adequately served by any licence So far, the State Electricity Board has not been set up for the State of Bombay but it is expected to beset up soon.

General lines of Development.

9. New power stations, hydro electric and thermal are being established and/or are in the process of investigation by the Electric Grid Department. Whenever possible, these new power stations will be interconnected by grid lines to existing efficient generating stations. Inefficient generating stations in the regions where grid lines are operating will be closed down and the licensees concerned will be supplied bulk power from the grid. Extensive rural areas within the economic reach of grid lines will be supplied electricity for agricultural purposes and for cottage and small scale industries. For those towns and ruralrural areas which are outside the economic reach of the proposed grid lines, Government have decided to establish small diesel stations or purchase power in bulk from the nearby Licensee in isolated towns or for a group of towns and villages which have possibilities for development of cottage industries and/or agricultural pupping. These small schemes are known as 'Nursery Schemes'. The criteria adopted by Government for selection of places for nursery development are that there should be (a) about 2000 dwelling houses and (b) cottage industries and/or

and /or agricultural pumping load of reasonable magnitude which could be operated by electricity to increase the productive and earning capacities of the villages.

Co.Ordinated Development.

10. In order that electricity be available at as low rates as possible, it is essential that it should be generated on a large scale at a few selected central station and transmitted and distributed By H.T. lines to various load centres.It is also of the utmost importance that all the big users of electric power should as far as possible use common power system.To achieve the latter objection negotiations have been carried out with the B.B. & C.I. & G.I.P. Railways which generate and use electric power on a large scale.Likewise, the former Government of Baroda was persuaded to abandon its scheme of establishment of steam stations .That Government agreed to take their power requirements at Baroda,Petlad, Kalol& Navsari and Billimora from the Grid system instead of setting up their own power stations as they has originally intended to do. The Railway Board also accepted the principle of the use where possible of common power system by the B.B. &C.I & G.I.P. Railways and the Grid Authority in the regions traversed by the two Railways . Pursuant to this policy, a joint investigation was undertaken by the Engineers of the B. C.I. Railway and the Grid department.Their report revealed that with a common system of generation and transmission, saving of about Rs.1¼ crores could be made in the capital cost alone for electrification of the section of the line between Bulsar and Baroda.Besides saving in capital cost

capital cost alone for electrification of the section of the line between Bulsar and Barad.Besides saving in capital cost, there will be further saving in operation and maintenance costs.With the electrification of the Virar-Ahmedabad section of the line, it will be possible to supply electricity to rural areas between i) Virar and Bulsar and ii) Surat and Baroda which cannot for the present be served otherwise on account of the present prohibitive costs With railway electricification, the overhead charges would be shared between the Grid Department and the B.B. & C.I. Railway making it possible to supply electricity to rural areas in the above regions at reasonable cost. Similar negotiations were in progress with the G.I.P. Railway for a joint system of power generation and transmission between Igatpuri and Bhusaval.However, due to financial stringency it is not proposed to consider this scheme for the present.

Electrification Schemes.

11. In pursuance of the policy outlined above the Government of Bombay have authorised the Electric Grid Department to execute and/or investigate the undermoted schemes, excent item (g):-

Schemes under Execution.

a) North Gujarat Electric Grid Scheme.
B) South Gujarat Electric Grid Scheme.
c) Jog-Karnatak Scheme.
d) Bombay Steam Station Scheme.
e) Emergency Irrigation Scheme, Kolhapur.
f) Radhanagari Hydro Electric Works, Radhanagari.
g) Tapi River Hydro Electric -cum Irrigation Project.
h) Nursery Schemes.

(i) Small Thermal Schems in certain isolated places and

(ii) Distribution Schemes, for certain concentrated rural areas based on power purchased from the existing licensees.

i) Extension of Gandevi power House of the former Baroda S

Schemes under Investigation.

j) Koyna Hydro Electric-cum.Irrigation Scheme.

k) Kalimadi Hydro Electric Scheme.

Description and present position.

of the Scheme under execution.

12. The North Gujarat Electric Grid Scheme.

Electric power under the North Gujarat Grid Scheme will be purchased from the Sabarmati Power Station of the Ahmedadbad Electricity Company which had in 1946 an installed capacity of 37,500 KW. which had increased to 67,500 KW in October 1950.The capacity of the station is being further increased to 97,500 KW by the addition of 2 x 15000 KW turbo alternator sets one of which has since come into sergice in December 1950. This capacity when originally planned was expected to be adequate for some years. However, the load ddevelopment actual as well as in sight, necessitated negotiations with Company for establishment of another station in Ahmedabad and it has been decided by the Company to erect another station, with an initial installed capacity of 45,000 KW, orders for which have already been placed.

Power will be initially supplied upto Baroda at 66,000 V. in the South and to Kalol in the North at 33,000 V. The areas within economic reach of this scheme is about 2400 square miles. Power will be supplied to Licensees and/or industries at Baroda, Petlad, Kalol Nadiad, Anand, Dakore-Umreth and Barejadi. Besides, supply will also be given to about 140 villages for domestic use, small scale and cottage industries and for some 800 agricultural pumps within the first 5 years from the date of commencement of supply. So far approximately 850 applications for agricultural pumps and small scale village Industries and 3100 for domestic lighting have been received.The scheme is estimated to cost approximately Rs 250 lakhs and is expected to be self supporting in the 3rd year of operation.

The 66 KV....

The 66 KV.transmission line from Ahmedabad to Baroda with one circuit strung has been completed . fabricatio of meterial for first st age distribution is in progress. Transformers for Baroda and Anand have been received.Erection of switchgear and other equipment at Sabarmati and Baroda Sub.Station is completed. Stringing of 2nd Circuit for 66 KV Ahmedabad -Baroda line is nearing completion.Erection of 11 KV and 33KV lines will commence shortly.(Supply under this Scheme is programmed to commenc in a few days.)

13. The South Gujarat Electric Grid Schemes.

This Schemes provides for the establisment of a Government-owned steam station at Utran near Surat with with an initial installed capacity of 15000 KW for which plant has been received and is under erection. Originally it was proposed to add another set of 7800 KW in the 3rd year of operation but consideration is now being given to utilise hydel power which may become available under Tapi River,~~mission line materials from countries offering~~ early delivery have been sent to the DirectorateGeneral of Industry and Supply,New Delhi. Electric supply under this project is expected to be commenced in 1953.The total estimated cost of the Scheme is expected to be about Rs 213 lakhs .

15. Bombay Steam Station Scheme:.

The load development in the area served by the Tata G.I.P. Interconnected Power System has exceeded the available capacity. The available power is distributed to the existing consumers by staggering of working hours or days of various industries. Although additional hydro capacity of about 22000 KW ordered by the Tatas and 24000 KW by G.I.P. Railway is expected to be brought into service in 1951 and 1952 respectively, further generating capacity of the order of about 60000 KW is required in the system to meet the unrestricted requirements of large industrial consumers and domestic loads upto 1956, when Koyna Hydel Power is likely to be available....

Hydro Electric-cum Irrigation Project which is under execution by the Central Water Power Irrigation and Navigation Commission on behalf of the Government of Bombay.

Power is proposed to be supplied to Surat ~~to Surat~~ and Rander Licensees at 22000 volts.Power will also be transmitted at 66000 volts from Utran to Billimora, with main substations at Navsari and Billimora.The Licensees of Navsari and Billimora will be supplied power at 11000 volts.Supply is also proposed to/be given to Bulsar Licensee at 11000 volts from Billimora Sub-Station.Besides, the above power will be supplied to 60 villages for domestic use, small scale and cottage industries and for some 350 agricultural pumps within the first 5 years of operation. The area within economic reach of this scheme is 900 sq. miles.The Scheme is expected to cost approximately Rs 321 lakhs. Supply under this Scheme is expected to commence ~~in the beginning of 1952~~. by end of 1951

14. Jog-Karnatak Distribution Scheme.

In consideration of the consent given by the Government of Bombay for the development of hydro at the common frontiers of the ~~two~~ states, the Government of Mysore have agreed to supply to Government of Bombay electric power upto 11,500 KW from the Mahatma Gandhi Power House at Jog. Government have approved the Scheme for distribution of this power in Dandeli,Dharwar,Hubli, Gadag,Byadgi and Rannibennur areas.Survey work of 110 KV and 33 KV transmission line routes is in progress. Receiving station sites have been selected and orders for transformers and switchgear have been placed with an American firm offering early delivery,Similarly, proposals to procure transmission line materials ~~from~~ from countries offering early delivery have been sent to the Directorate General of Industry and Supply New Delhi.Electric supply under this project in expected to be commenced in 1953.The total estimated cost of the Scheme is expected to be about Rs 213 lakhs------

15. Bombay Steam Station Inhaus.

The load development in the area served by the Tata G.I.P. interconnected Power system has exceeded the available capacity. The available power is distributed to the existing consumers by staggering of working hours or days of various industries. Although additional hydro capacity of about 22000 KW order by the Tatas and 24000 KW by the G.I.P. Railway is expected to be brought into service in 1951 and 1952 respectively further generating capacity of the order of about 60,000 KW is required in the system to meet the unrestricted requirements of large industrial consumers and domestic loads upto -956 when Koyna Hydel Power is likely to be available.

Contd from Page No 12.

In the meanwhile it has been decided by Government to supplement the capacity of the Tata-GI.P. Interconnected system by 3 x 18000 KV steam turbo sets which will be installed in the Chola Power House of the G.I.P. Railway near Kalyan.

The Scheme is expected to cost approximately Rs 300/- lakhs.

Orders for the complete plant have been placed and it is expected that power from the proposed sets will be available in 1953.

16. Emergency Irrigation Scheme and power supply for irrigation and industries and conversion to A.C. supply of D.C. areas taken over from Kolhapur Licensee.

Besides the Radhanagari Hydro Electric Project mentioned in para 17 below the following work of the former Kolhapur State are under execution under the administrative control of the Grid Department.

i) Emergency Irrigation Scheme and arranging power supply for irrigation and industries.

ii) Conversion from D.C. to A.C. by gradually taking over D.C. area of supply of Kolhapur Licensee.

Emergency Irrigation Scheme was sanctioned by the former Kolhapur Government at an estimated cost of about 10 lakhs. The scheme was mainly undertaken for Irrigation purposes under 'Grow More Food Compaign' and later extend for power supply to industries at Kophapur. Briefly, the scheme comprises construction of a diesel power house of 1350 KV capacity, construction of H.T. & L.T. transmission lines and sub-station between Kolhapur and Shirol a distance of about 30 miles, erection of 44 electrically driven pumping sets on the banks of the Panchgana River and erection oof Hume Pipe Lines for proper distribution of water in fields. The construction work was started in 1947 and completed in June 1948.

There

There are now 39 pumps working and water is being supplied for irrigation purposes.About 1000 acres of land are under cultivation.Arrangement is in hand to install the remaining 5 pumps in consultation with the Irrigation Department.

For supplying power to industries and for other purposes in some areas in Kolhapur City which were not adequately served by the licensee on account of his D.C. system of supply, the former Kolhapur Government had taken over from the Licensee some D.C. areas comprising Bawda, Tarabai Park and Sykes extension for supply from the Government 's A.C. system.For this purpose the Kolhapur Government had sanctioned an amount of about Rs one lakh. for the conversion work. The first stage coversion has been completed.The licensee has agreed to release further areas to Government for supply from A.C. system and the work is accordingly being undertaken.

17. Radhanagari Hydro Electric Works.

Consequent on the merger of Kolhapur State with the State of Bombay, the Radhanagari Hydro Electric Works were taken over by the Government of Bombay. Radhanagari Hydro Electric works is a multipurpose Project (Irrigation, power generation and water supply) and comprises construction of a dam of about 140 ft. high above the deepest foundation across Bhogavati River about 32 miles from Kolhapur and a power station with a installed capacity of 4800 KW at Radhanagari in Kolhapur District.

Electricity will be supplied to Kolhapur City and and villages along the proposed transmission routes between Radhanagari and Kolhapur and includes supply for irrigating 8000acres along Bogawati and Panchgana Rivers for which 100 pumps have been ordered.The scheme is expected to cost Rs 225 lakhs.

78% masonry for Dam work has been completed 70% of the generating plant has arrived and erection is in progress. Survey work of 33 KV lines has been completed.Orders for transmission and Distribution material have been placed in part and....

part and balance will be placed soon.Construction work has also been started.

The supply is expected to be commenced in 1951-52.

18. Tapi River Hydro Electric-cum Irrigation Projects.

This project was formerly intended for irrigation purposes only. However, it has now been decided to develop hydel power initially of 24,000 KW, the ultimate capacity being 216,000 KW.The work is being carried out by the Central Water Power Irrigation and Navigation Commission on behalf of the Bombay Government. Tapi Power, when available will supply the power requirements of the South and North Gujarat Grid Schemes.

Nursery schemes - small Thermal station

19. In accordance with the policy of Government described in para 9 above, Government had originally approved electrification, by small diesel stations, of the towns of Ratnagiri, Chiplun, Malwan, and Vengurla in Ratnagiri District and of Islampur and Peth in Satara District.Supply was commenced in these towns during 1949 and 1950. (The number of consumers and the load connected on the system upto October 1950 are as under:-

Town	Date of commencement of supply.	No. of consumers connected.	Connected load KW.
Vengurla	30-11-49	211	210
Ratnagiri	17- 8-50	365	280
Chiplun	4- 6-50	198	124
Malwan	9- 9-50	114	57
Islampur	22- 12-50		
Peth	29- 1-51) 7- 2-51		

1) Tithal)
2)Sagivi) Bulsar Taluka Village Electrification Scheme.
3)Bhagdwada)
4)Kosamba)

Subsequently Government also approved the schem of electrification of (a) Guledgud and Ramatgi (Bijapur District) (b)--------

(b) Ilkal, Hungund, Sulebhavi ,Amingad, and Mudor(Bijapur District) (c) Kakeri,Chikodi, Gokak,Konnur and Sankeshwar (Belgaum District) (d) Sailhongal (Belgaum District)
(e) Dharangaon,Parola and Erandol (East Khandesh District)
(f) Dholka (Ahmedabad District) (g) Dhanduka (Ahmedabad District)
(h) Akluj (Sholapur District), i) Gajendergad (Dharwar District)
Orders for the power plant for the schemes under a,b,c,d, and e, have been placed and other work connected with the Schemes is in the hand Owing to the financial stringency, work on the remaining Schemes has been postponed.

20. Distribution Schemes for Villages.

Government has also sanctioned originally electrification of 21 villages in Satara Taluka and 10 villages in Bulsar Taluka with power purchased in bulk from the licensees, of Satara and Bulsar respectively and also some rural areas between Lonavala and Talegaon in Poona District with power purchased from Tatas.The supply in the 21 villages of satara Taluka will be commenced soon as Satara licensee makes power available.Supply in Bulsar villages has already been commenced.As regards the electrification of Lonavale-Talegaon area as power is not available from the Tata System due to acute power shortage, the work cannot be undertaken at present.

21. Extension of Gandevi Power Station of former Baroda State.

The former Baroda Government had sanctioned the extension of Gandevi Power House at an estimated cost of Rs 2.67 lakhs providing for installation of two 256KW diesel generating sets, switch gear etc. and extension of the Power House Building with a view to increase the capacity of the power station to meet the increased demand for power.The plant and equipment already ordered has been received and the work is under execution.

22. Description and present position of Schemes under investigation Koyna Hydro Electric Scheme.

The Government of Bombay sanctioned detailed investigations survey work and preparation of the Project report of the Koyna Hydro Electric Scheme. The Project report was completed in June 1950 and is receiving the consideration of Government,Tentative proposals envisage the construction of a dam approximately 300 ft. high above the river bed across the Koyna River at Jalkewadi-----

about 2 miles off Helwak on Karad Chiplun Road, The total quantity of water to be impounded would be 1,50,000 Mcft. It is at present proposed to utilise out of this 44,000 Mcft. for irrigating 4,46,000 acres of land including those in the scarity area of Bijapur District. After reservation of water for irrigation, this Scheme is capable of developing 2.25.000 KW continous power (3,40000 firm power). If all the water is used for power supply 4,00,000 KW continous (500,000 KW firm) could be developed. This power will be transmitted to Bombay and the Districts of Ratnagiri, Satara, Bijapur, Sholapur, Poona and Thana. A large block of 150,000 KW initially (2,50,000 KW at a later stage) will be supplied to Bombay to meet the power requirements in that area.

If the execution of the Scheme is decided on within the next few month, it is planned to bring Koyna Power to Bombay in 1957 - 58. The estimated cost of the Hydro Electric part of the Scheme is Rs 5451 lakhs.

23. Kalinadi Hydro Electric Project.

In the Kanara District. Kalinadi basin has been surveyed and it has been found that in al series of four power stations about 3,25,000 KW of continous power can be developed. Considering the anticipated load requirements in the areas which could be served from this source of power, only one of the stations, viz. that at Supa with an installed capacity of 60000 KW may be developed for the present at an estimated cost of Rs 12 crores exclusive of the cost of transmission and distribution lines. The power, when made available, will be suppled to the Districts of Kanara, Dharwar, Belgaum and Bijapur which appear to be within economic reach of this source of power.

24. Merged State Power Houses:

With the merger of the former Indian States

with the State of Bombay, the following Government owned power houses of the merged States in operation have come under the control of the Grid Department. The work of renovation and remodelling the generating and distributing System is receiving attention:-

1. Chhota-Udepur.
2. Rajpipla
3. Himatnagar.
4. ~~Dharampur~~ Radhanpur
5. ~~Radhanpur~~ Dharampur
6. Bansda.
7. Mansa.
8. Santrampur.
9. Devgad-Baria.
10. Janjira.
11. Gandevi.
12. Jawhar.

25. MAGNITUDE OF FUTURE DEVELOPMENT IN THE PROVINCE.

If the Schemes actually under construction at present are completed according to present plans, the installed capacity and energy generated in the State of Bombay in 1953-54 would be as shown below. If Koyna Hydro Electric Scheme is undertaken as proposed the position in 1950 will be as given in the statements below.

1946		Present		1953		1960	
Installed capacity in MW.	Units generated in million units		Units Generated in million units		Units Generated & installed capacity in MW.	Installed capacity in MW	Units generated in million units
331	1305	407 160057		590	2290	936	3690.

1946		Present		1953		1960	
Installed capacity in MW.	units generated in million unit:	installed capacity in MW	Units generated in million units.	installed capacity in MW.	Unit: generated in million units.	installed capacity in MW.	Units generated in million units.
331	1305	407	1600,57	580	2290	936	3690

Besides, as against a total of 450 miles of Tatas' Extra High Tension lines in existance, there may be an addition of another 117 miles by 1953/54 and over 1000 miles by 1960.

The summary of the estimated capital costs of the electrification Schemes of Government of Bombay under execution by the Electric Grid Department is givenn below.-

Names of the Scheme.	Estimated cost.	
1. The North Gujarat Grid Scheme.	251.26	lakhs.
2. The south Gujarat Grid Scheme.	321.26	"
3. Radhanagari Hydro Electric works.	225.00	"
4. Bombay steam station scheme.	300.00	"
5. Nursery schhmes.	123.05	"
6. Jog-Karnatak Scheme.	213.00	
7. Emergency Irrigation Power House, Kolhapur.	26.65	"

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Besides, as against a total of 450 miles of Tatas' Extra High Tension lines in existence, there may be an addition of another 117 miles by 1953 and 54 and over 1000 miles miles by 1950.

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Names of the Schemes.		Estimated cost.
1. The North Gujarat Grid Scheme.	251.01	Lakhs.
2. South Gujarat Hydro. Electric Works.	321.26	"
3. Radhanagari Hydro Electric Works.	225.00	"
4. Bombay Steam Station Scheme.	300.00	"
5. Jog-Karnatak Scheme.	213.00	"
6. Nursery Schemes.	123.05	"
7. Emergency Irrigation Power House, Kolhapur.	26.65	"

If Koyna Scheme is sanctioned for execution, the estimated cost for this Scheme is Rs 5451.00 lakhs spread over a period of some 15 years. This includes interest during construction.

All these figures when added make up a large n of money. But when considering the figure, the present high cost which are nearly three times the pre-war cost, must be kept in mind. The development of our resourses has been very meagre, so far, and we have a lot of leeway to make up. These amounts must therefore obviously be found and invested to rectify this position in order to increase the productive capacity and per capita income of our people.

27. DIFFICULTIES IN THE WAY.

Certain factors such as paucity of tehhnical personnel, shortage of steel, delays in securing transport and the like, and above all the very long deliveries of power plants and equipment imported from abroad adversely affext the progress of development work. Steps are being taken by the Bombay Government and the Government of India to improve the position in this connection

ID. Electrical Commission, With the Government of Bomba

Programme of Electrification.

The paramount importance of the supply of cheap and abundant elec. power for the industrial and agricultural development of the urban and rural areas has long been recognised by Bombay Govts. and programmes of electrification has always been given a very high place in its development plans. After a careful study of serveral factors such as the possibility of making power available at economic rates, scope for industrial and agricultural Devt. of a place etc. Govt. has embarked upon a programe of electrification which it is hoped will bring the blessings of electy. within the reach of a large number of people of this States, progressively. A comprehensive idea of this programme with necy. details such as the works under aexecution, the capital costs involved, the magnitude of future development, the difficulties in the way etc. can be had from article under the caption Programme of Electrification which has already appeared in No. 3 of this publication. Some further information is given here with pictures and charts which will be interesting to the readers. (In accordance with the Govts. programmed of rural electrifications by means of Diesel Nursery Power Stations in small towns supply of electric energy has commenced at the following places with effect from the dates shown :-

Name of Places.	Date of commencement.
1. Vengurla	30th Nov. 1949.
2. Ratnagiri : Ratnagiri Dist.	17th Feb. 1950.
3. Chiplun	4th June 1950.
4. Malvan	9th Sept 1950.
5. Pethampur : Satara District.	22nd Dec. 1950.
6. Peth	29th Jan 1950.
7. Tithal, Kosamba, Bulsar Segvi and Bhagawada. District.	7th Feb. 1950.

The Satara Taluka village scheme is ready to commence supply immediately bulk supply is available by the

the Satara Electric Supply Company. The schemes for the electrifications of 7 towns in Bijapur District, 3 towns in East Khandesh District and 6 towns in Belgaum District, are making a reasonably good progress and supply under these schemes is expected to commence in 1952.

North Gujarat Electric Grid Scheme.

This scheme was inaugurated by the Hon. Dr. Jivraj N. Mehta.P.W.D. Minister on the 15th Feb. 1951. The estimated total cost of this scheme is Rs 2½ crores.Under this scheme a double circuit 66,000 volt transmission system has been set up from Ahmedabad to Baroda and 33,000 volt single circuit system to Kalol in the scheme is about 2400 sq. miles.Power will be supplied to licensees and industries in Baroda, Petlad, Kalol, Nadiad, Anand, Dakor Umereth and Barejadi.Supply will also be given to about 140 villages for domestic use, small scale industries and for over 800 agricultural pumps. The pricipal places from the amongst the fairly large number of towns which will besupplied electy.m in addition to the towns mentioned above, are Kaira, Ahmedabad, Borsad, Chaklasi and several others.Wherever there are licencees in the above area bulk power will be supplied to them for distribution.Actual distribution will be done by Grid Authorities where there are no licensees.Under the above scheme supply has been commenced initial to Baroda.It will commence at Kalol,Nadiad,Anand and Barejadi etc. and gradually power will be made available to increasingly large areas in Gujarat. The tariff rates under this are reasonably economical and they could not have been obtained except on the basis of regional development carried out under the Electric Grid. The advantage of regional development is two fold. One, that electy. can be made available in rural areas on a large scale for the first time in the state from the Central source of power, and two that in view of this fact the rates for electy. supply will be such that rural industries and irrigation pumps can operate economically, This would not have been the case if small diesel stations had been developed in the area. The tariffs for high tension supply to large industries as fixed work out to about 12 to 15% higher, depending on the power factor and load....

factor of the consumer, than the corresponding tariffs applicable for similar supply at Ahmedabad. When it is considered that transformer and line losses of the order of 20% will be sustained in transmission and distributing power from Ahmedabad and very large expenditure on works -3- times the pre-war will have to be incurred, it willbe readilly agrrd that the rates for supply in this area which are only 12% to 15% higher those available i n Ahmedabad are very reasonable. The average rate per unit works out to abou 0.65 to 0-75 anna on the basis of cost of coal at Rs15/- per ton. In the case of tariffs for supply to the licensee the average rate works out to less than than 1 anna per unit at the above mentioned basic cost of coal.

The average rate for small industrial consumers is less thank 1.3/4 annas per unit at about 40% load factor on the above mentioned price of coal. Supplies for domestic purposes will given at 5 annas per unit for the first 25 units and 4 annas per unit for every additional unit thereafter, against the rate of 8 annas per unit charged by licensees in some towns in the state.

South Gujarat Electric Grid Scheme.

This scheme has made a very rapid progress and is expected to commence supply by the beginining of 1952.

The works in respect of the extension of the Chol Station of the G. I.P. Rly. in Bombay for relieving power shortage in that area, and those of Jog. Karnatak Elec. Grid Scheme for distribution of power purchased from Mahatma Gandhi power station of Mysore Govt. in the south of this state are making a steady prggress. Most of the survey work, much designs work and preparation of specifications and inviting of tenders have been quickly done and dorders have been placed for a substantial part of the plant and equipment. These schemes would be functioning in a couple of years.

Bombay Govt. has also taken over the schemes undertaken by the former states merged in the Bombay State Among those the following schems are under execution...

1. Emergency Irrigation Scheme and arranging power supply for irrigation & Industries.
2. Conversion from D.C. to A.C. by gradually taking over D.C. area of supply of Kolhapur Licensee.
3. Radhanagari Hydro Elec. Scheme.

Emergency Irrigation Scheme was sanctioned by the former Kolhapur Government at an estimated cost of about Rs 10 lakhs.The scheme was mainly under taken for Irrigation purposes under 'Grown More Food Campaign' and later extended for power supply to industries at Kolhapur.Briefly the scheme comprises construction of a diesel power house of 1350 KW capacity, construction of H.T. & L.T. transmission lines and sub.stations between Kolhapur and Shirola a distance of about 30 miles erection of 44 electrically driven pumping sets on the banks of the Panchganga River and erection of Home pipe lines for proper distribution of water in fields. The construction work was started in 1947 and completed in June 1948.

There are now 39 pumps working and water is being supplied for irrigation purposes.About 1000 acres of land are under cultivation.Arrangement are being made to install the remaining 5 pumps in consultation with Irrigation Department

Conversion Scheme in Kolhapur.

For supplying power to industries and for other purposes in some areas in Kolhapur City which were not adequately served by the licensee on account of his D.C.system of supply, the former Kolhapur Government had taken over from the licensee some D.C. area comprising Bawdo,Trabai Park and Sykes extension for supply from the Govt.'s A.C. system.For this purpose the Kolhapur Govt. had sanctioned an amount of about Rs one lakhs for the conversion work.The first stage comersion has been completed .The licensee has agreed to release further areas to Govt.for supply from A.C. system and the work is accordingly being undertaken.

Radhanagari Hydro Electric Works.

Consequent on the merger of Kolhapur state with....

state of Bombay, the Radhanagari Hydro Electric works have been taken over by the Government of Bombay. Radhanagari Hydro Electric works is a multipurpose Project (Irrigation, power generation and water supply) and comprises construction of a dam of about 140 ft high above the deepest foundation across Bhogavati River about 32 miles fr Kolhapur and a power station with an installed capacity of 4800 KW at Radhanagari in Kolhapur District.

Electricity will be supplied to Kolhapur City and villages along the proposed transmission routes between Radhanagari and Kolhapur and includes supply for irrigating 8000 acres alongax Bogbawati and Panchganga Rivers for which 100 pumps have been ordered. The scheme expected to cost Rs 225 lakhs.

78% masonry for dam work has been completed 70% of the generating plant has arrived and erection is in progre Survey work of 33 kv lines has been completed. Orders for transmission and Distribution of material have been placed in part and balance willbe placed soon. Construction work has also been started.

The supply is expected to be commenced in 1951-52.

Extension of Gandevi Power House Station of former Baroda State.

The former Baroda Govt. had sanctioned the extension of Gandevi Power House at an estimated ccost of Rs 2.(lakhs providing for installation two 255 kw. diesel generati sets, switch gear etc. and extendion of the Power House Building with a view to increase the capacity of the power The plant and equipment already ordered has been received and the work is under execution.

Magnitude of future development.

As a result of undertaking various Grid Schemes by Govt. the installed capacities and energy generated in the state of Bombay in 1953 -54 would be as shown below position in 1950, if Koyna Elec. Scheme is undertaken by Govt. its als given below:-

1946		Present		1953		1950.	
Installed capacity in MW.	Units generated in million unit:	Installed capacity in MW.	Units generated in million units.	Installed capacity in MW.	units generated in million units	Installed capacity inMW	units generated in million units.
331	1305	407	1600.57	580	2290	936	3690

Besides as against a total of 450 miles of Tatas Extra High Tension lines in existance there may be an addition of another 117 miles by 1953/54 and over 1000 miles by 1960.

The summary of the estimated capital costs of the electrification Schemes of Government of Bombay under exwcution by the Electric Gridd Deptt. is given below.

Name of the Scheme	Estimated cost
1. The North Gujarat Grid Scheme.	251.01 lakhs.
2. The south Gujarat Grid Scheme	321.26 "
3. Kadhanagari hydro Electric Works.	225.00 "
4. Bombay Steam Station Scheme	300,00 "
5. Jog.Karnatak Scheme	213.00 "
6. Nursery Scheme	123.05 "
Emergency Irrigation Power House,Kolpur	26.65 "

Amendments to be carried out in the note attached to this office No. PP-2/4372 dated 13th Feb. 1951.

Para. 12.

Sub. para 1 of para 12 may be re-written as under:-

"Electric power under the North Gujarat Grid Scheme wil be purchased from the Sabarmati Power Station of the Ahmedabad Electricity Co. The installed capacity of which has increased for 37000 kw. in 1946 to 82,500 kw in December 1950. One more set of 15,000 Kw. capacity is under erection and is expected to nbe commissioned in service in May 1951 when the total capacity of the Sabarmati Power station will have increased to 97,500 kw. This capacity when originally p planned was expected to be adequate for some years.However the load development actual as well as in sight necessitated negotiations with the company for establisment of another station in Ahmedabad and it has been decided by the company to erect another staion with an initial installed capacity of 45,000 kw. orders for which have already been placed."

In sub para 3, para 12, the last sentence viz. ' 'Supply under this scheme is programmed to commence in a few days ' may be substituted by "supply of power under this scheme has already commenced to the Baroda Licensee on 15th Feb. 1951.Supply to other consumers in Baroda will commence shortly.Supply from Nadiad and Anand Sub.stations is scheduled to commence in June 1951 and from Kalol Sub.station in August 1951."

para 15.

In the last sentence of sub. para 1 to words " 3 - 18,000 KW steam turbo sets" may be substituted by " 3- 15,000 KW (ultimately 18,000 KW) steam turbo sets"

The next sentence viz."The scheme is expected to cost approximately Rs 300 lakhs " may be substituted by 'The scheme is expected to cost approximately Rs 345 lakhs including the cost of additional boiler to obtain the full output of 18,000 KW from these sets'

Para. 22

At the end of para 22 add the following as

a sub para.

As the project involves large capital expenditure, Government is also considering partial development of the initial stage of the project by providing 4 generating sets of 60,000 kw. each of which one will serve as stand by, instead of 7 sets originally provdied in the project by and initial transmission of power to Bombay area at an estimated cost of about Rs 35 crores. The irrigation part of the project has not been included in this partial development The Govt. of Bombay had appointed a committee of experts to report on the type of dam and whether the urface or underground power station would be more suitable. The committee has now submitted a report of its findings which is reveiving the attention of Govt. according to the framed estimate passed on the basis of the advise of the experts the estimated cost of the first stage project would be about Rs 35 crores against Rs 45 crores originally estimated.

18-6-56